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UNIT Plant Growth and Changes BIG IDEAS In this unit, you will learn that: most First Nations and Métis people see plants as gifts from Creator plants have similar parts and needs plants change as they grow plants are important to living things plants and the environment affect each other people can affect plants Unit 1 Plant Growth and Changes



People depend on plants in many ways. Humans and other animals use plants for food. Animals use plants for shelter. People use plants to make clothing and even use some plants as medicine. Many First Nations and Métis people also use plants for special ceremonies. Some ceremonies link them to their ancestors. Other ceremonies offer special respect to Mother Earth.

In this unit, you will find out what all plants have in common. You will learn about what plants need to grow and how you can care for plants.

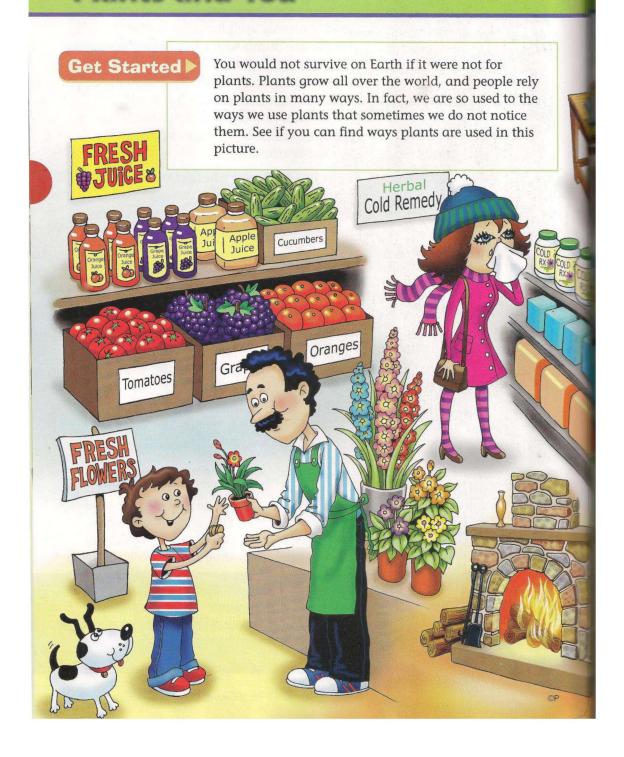
Looking Forward

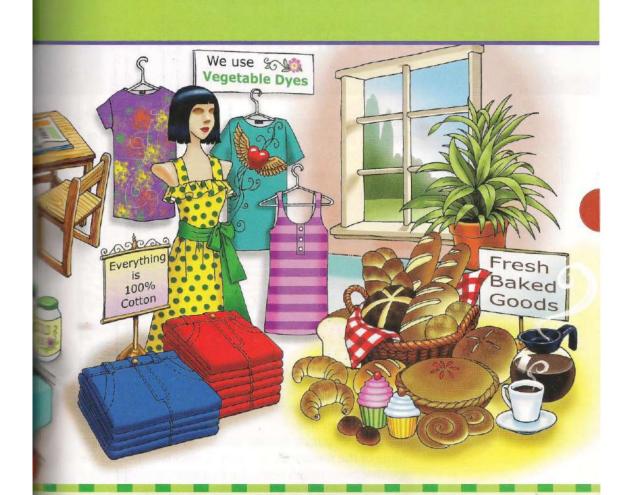
- With the class, create a KWL chart like the one below.
- Fill in the first two columns. You will complete the last column during the unit.

What I Know What I Want I
About Plants To Know Learned
About Plants About Plants

At the end of this unit, you will complete a design project. You will create a garden. The *Build On What You Know* activities found in the unit will help you with your project.

Plants and You







- 1 Look at the picture. Make a list of the different ways people use plants.
- 2 Compare your list with your classmates' lists. Do they have ways on their lists that you do not? Add these to your list.

Communicate



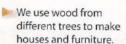
- With your class, start a list of all the different types of plants around your school and neighbourhood.
- 2. What items in your classroom are made from plants? List them.
- 3. Think of what you ate for breakfast. Did anything come from plants?

How Are Plants Useful?

Goal To explore how people use plants

Get Started▶

Plants are important to us. Trees and other plants produce some of the oxygen we need to breathe. The oxygen comes from the leaves of plants.





We also use something every day that comes from trees. Can you guess what it is? It is paper! Paper is made from trees. Books, magazines, and notebooks are all made from trees.

Some of your clothes are made from plants, too.

Some of the medicines that help us feel better when we are sick come from plants. For example, the pain reliever Aspirin™ comes from the willow tree.



First Nations have been using plants in many ways for thousands of years. Look at these photos and discuss the ways shown.



Some First Nations and Métis people use the purple coneflower for pain relief. Today, you can also buy purple coneflower (*Echinacea*) pills at stores as a remedy for the common cold.



Tobacco is sacred to most Cree [Nehiyawak] people. They offer it to Mother Earth in return for harvested plants. They also use it in ceremonies of the smoking of the pipe and when sharing stories.



Some First Nations and Métis people create patterns by biting birchbark. This is used for decorating clothing made from animal skins. Today, birchbark biting is an art.

Most First Nations and Métis people used to make canoes out of birchbark. They used spruce tree roots and spruce gum or sap to hold the bark together.



Communicate



- Describe three ways that most First Nations and Métis people have used plants.
- 2. Use the Internet to find out other ways that some First Nations and Métis people have used willow bark. Share your findings with the class.



Traditional tobacco is different from that in cigarettes. It is a mixture of dried plants and willow bark.

Build On What You Know

How might people use the plants in the garden you will create? Record your ideas.

Plant Parts

Goal To look at and compare parts of different plants

Get Started

Plants come in many shapes and sizes, but scientists see that all plants have parts that are alike. You may not be able to see all the parts of a plant at the same time. Here are some plant parts that are similar in different plants.

Flowers:

The flowers of a plant contain parts to produce seeds. The flowers produce fruits with seeds inside.

Seeds:

Seeds come in many shapes and sizes. New plants often grow from seeds.

Leaves:

Most leaves are green. This is because leaves have a very special green substance in them. Scientists call this substance **chlorophyll**. It can trap energy from sunlight to make food for the plant.

Stem:

The stem (or trunk) of a plant holds the plant up. It carries water and nutrients from the roots to the leaves. Sometimes stems can store food,

Roots:

Roots hold the plant in the ground. They absorb water and nutrients. Some roots can store food for the plant. Do plant parts look the same on different plants? In this investigation, you will look at the parts of two different plants.

What You Need

- indoor plant with roots, leaves, and flowers
- newspaper
- magnifying lens
- carrot with a stem

What You Will Do

- Look closely at the indoor plant.
- 2 Draw and label the parts of the plant.
- Look closely at the carrot.
- Draw and label the parts of the carrot. (**Hint:** What part of the carrot is found in the ground?)



Communicate



- 1. How are the parts of plants the same?
- 2. How are the parts of plants different?
- 3. What does each part of plants do?
- 4. Might the plants look different at another time of the year? Sketch the changes you might see in one of the plants over the summer, fall, winter, and spring.

Exploring Plant Parts

Goal To explore the parts of plants and what they do

Get Started

You have seen that plants have roots, stems, seeds, flowers, and leaves. What parts of plants are showing in this photo?



Work On It

大大

Now you will look at some parts of a celery plant and see how water travels up the stem of a plant.

was alive!

rings will tell you how many years the tree

What You Will Do

- Draw a picture of the piece of celery. Label the two plant parts you can see in it.
- Mix the food colouring and water in the container.
- Cut off the bottom end of the celery.
- Stand the cut end of the celery in the container of coloured water.



Mark the level of the water in the container.

What You Need

- celery stalk with leaves
- spoon table knife
- clear container
 marker
- water
- magnifying
- red food colouring
- lens



SAFETY CAUTION!

Ask your teacher to help you cut the celery with the knife.

- Wait until the next day. Look carefully at the celery stalk and leaves, and check the water level.
- Cut across the middle of the celery. Draw a picture of what you see.

Communicate



- 1. Look at your drawing of the parts of the celery. Explain why each part is important to the plant.
- 2. Explain to a partner what happened to the celery stalk after it sat in coloured water.
- 3. What happened to the water in the container?
- 4. How does a plant get water? (Hint: A celery stalk is the stem of the celery leaf. What does a stem do?)

11

How Do Plants Grow?

Goal To find out what a seed needs to begin to grow

Get Started

Many plants begin their lives as seeds. Seeds can be different shapes and sizes. Seeds are important—they grow into new plants.



A tree [mistik in Woodland Cree and mitos in Plains Cree] begins as a seed.

Do any of these seeds look familiar? Where have you seen them?

Before seeds grow into plants, they must germinate, or sprout. In this activity, you will watch how a seed begins to grow.

What You Need

- 4 bean seeds soaked in water overnight
- paper towels
- water
- 4 resealable plastic bags labels and
 - marker

What You Will Do

Carefully place each bean seed between wet paper towels. Place each inside a plastic bag and seal the bag.

Label one bag "warm place with bright light," another bag "warm place with low light," another "warm place with no light," and another "cold place with no light."

Put each bag in a place that matches the place on its label.

What do you think will happen to each seed? Write down your predictions.

Over the next five days, keep the paper towels moist, and check if the seeds have changed. Draw a picture of what you see each day.

Label the parts that you see after the fifth day.





Communicate



- 1. Which seed grew the best? Explain to a partner why you think that it grew the best.
- 2. What do seeds need to sprout?
- 3. In your KWL chart, add what you have learned about plants and any new questions you have.

Build On What You Know

How will you care for the plants in the garden you will create? Plant one of the sprouted seeds in soil, and find out what it needs to grow.

13



Basic Needs

Goal To compare the needs of plants and animals



There are many different kinds of plants in the world. All plants need certain things to help them grow. Animals are also found all over the world. All animals must have certain things in order to live. Scientists say humans are animals, too.

Most First Nations and Métis people understand everything in the world is a gift from Creator. Everything is alive because Spirit flows through everything. Plants and animals deserve our respect because they contain Spirit, just as we do. Plants and animals are living things. What do all living things need to survive?

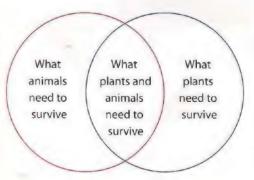
Plants need space to grow. What else do plants need to survive?

> Animals need space, such as a forest, to live in. What else do these animals need to survive?



Do plants and animals need the same things to survive? Or, do plants need different things than animals? Work with a partner to find out if plants and animals have the same needs.

- What do the animals in the picture need to survive? Make a list to record your answers.
- What do the plants in the picture need to survive? Make a list to record your answers.
- In a diagram like this one, list the things that both animals and plants need to survive.



Communicate



- 1. What do plants need to survive?
- 2. Do plants and animals need any of the same things? Explain your answer to a partner.
- Plants are an important food source for humans and other animals. Name two other animals that get food from plants.
- 4. Think about what you have learned. What new questions do you have about the needs of plants? Add them to your KWL chart.

Build On What You Know

Check if the bean plant you began growing in Lesson 4 has everything it needs. How can you design your garden to make sure it meets all the basic needs of plants? Sketch or list your ideas.

Helping Plants Get Water

Goal To explore how plants need water



You have learned that plants need water to survive. Plants need water to keep their shape, turn sunlight into energy, and take in nutrients from soil. Plants also use water to carry nutrients from their roots to their leaves. Plants also give off water through their leaves to cool off in hot weather.

Since plants use water for so many things, they need a way to get a lot of water easily. Water is in the air and in the ground. The roots of plants take in water from the ground. The stems of plants then carry water from the roots to the leaves. In fact, you have seen that the stem of a celery leaf is like a highway for transporting water.

 Plants send out roots in all directions to take in water from soil.

Work On It

In this activity, you will see how plants depend on water.

What You Need

- 2 bean plants
 marker
- water
- camera (optional)





Communicate



- Was your prediction correct? Show your drawings, photos, or videos and describe what happened to each plant.
- 2. Explain how water is important to plants.
- **3.** In your KWL chart, add what you have learned about plants and any new questions you have.

Build On What You Know

How often do you think you will need to water the plants in your garden? Write down your ideas.

Some plants take in fog. Fog is a thick cloud of water droplets. In the summer, rainforests on Canada's west coast are dry but get a lot of fog. The trees take in the fog water through their leaves.

Life Cycles

Goal To explore the life cycles of plants

Get Started



In Lesson 4, you observed seeds begin to sprout and become plants. Some plants live only for a year. In this short time, seeds sprout and produce roots, leaves, a stem, and flowers. The plants also make new seeds. Other plants live much longer and sometimes take many years to produce seeds. When a seed grows into a plant and starts producing new seeds, one life cycle has been completed.

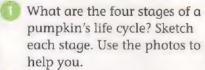


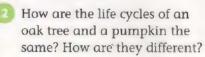


The life cycle of an oak tree takes a long time to complete. The life cycles of other plants are much shorter. If you plant a pumpkin seed in the spring, you will have a pumpkin with seeds inside in time for Thanksgiving! A pumpkin's life cycle is only four months.

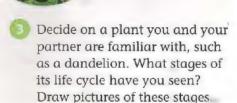
Work with a partner to answer these questions.











Communicate



- 1. Which features, such as colour or texture (its feel), stay the same during a pumpkin's life cycle?
- 2. Which features change during its life cycle? Explain how the environment might affect these changes.
- 3. With a small group, create a skit that shows the life cycle of a plant. Present the skit.
- 4. Look at the photos shown here. What questions do you have about how poplar trees and other plants grow? Make a class list.



Life Cycles

tree

Grouping Plants

Goal To look at and compare characteristics of different plants

Get Started

Plants grow and change through their life cycles. But some parts of plants are always the same. The leaves on a small birch tree have the same shape as the leaves on a large birch tree.

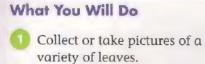




The white birch is the provincial tree of Saskatchewan. It can be found throughout three-quarters of the province.

Work On It

There are many different kinds of plants. Some have leaves shaped like an egg. Some have leaves shaped like a needle, and some have no leaves at all. Some have purple flowers and others have pink flowers. In this investigation, you will look at two features of plants that scientists use to tell plants apart.



- Sort the leaves into different groups, as scientists do. Use one feature at a time, such as shape.
- What do the leaves in each group have in common?
- Draw a table like the one below.
- Paste your pictures on the table to show how you sorted the leaves.
- Repeat steps 1 to 5 with flowers.



What You Need

glue

pictures of a variety

camera (optional)

of leaves and flowers

large pieces of paper

Communicate



- **1.** Why do you think scientists use leaves to group and identify plants?
- **2.** What season in Canada makes it difficult to identify some plants? Explain your answer.
- **3.** Can you think of other features that stay the same whether plants are young or old? List them.
- **4.** Could you use the features on your list to group plants? Share and discuss your answer.

How Do Animals Help Plants?

Goal To find out how animals help plants

Get Started

You have learned that plants and animals have similar needs. They both need air, food, water, and space to live and grow. Plants and animals depend on one another to get what they need.

Animals use plants for food and to build homes. But how do animals help plants? Scientists explain one way how in the pictures below.

Flowers produce a sweet liquid called nectar. Nectar is food for insects. Flowers also produce a special powder called pollen. Pollen is produced in a part of the flower called the stamen.





Insects such as bees are attracted to the flower by the nectar. Pollen from the flower sticks to them.

Later, the insect moves on to another flower.
The pollen stuck on the insect brushes off onto a different part of this flower. This part is called the pistil. This process is called pollination. Flowers need to be pollinated to make seeds.





Now the flower can make seeds.



You will investigate another way animals can help plants.

What You Need

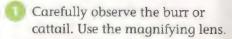
- burr or cattail
- magnifying lens
- tweezers



SAFETY CAUTION!

Burrs can be sharp. Use tweezers to handle them.

What You Will Do





- Draw a picture of what you see.
- Take the burr or cattail apart using the tweezers.
- Draw a picture of what is inside the burr or cattail. The small objects are the seeds of the plant.
- How do you think animals help the plant that produces the burr or cattail? (**Hint:** How could animals help carry the seeds to other places?)

Communicate



- 1. How could wind help with pollination?
- 2. Explain how water could help spread plant seeds.
- Research how another plant relies on animals or the environment (wind or water) to spread its seeds. Share your findings with the class.

25

Take a Field Trip

Goal To discover plants in your neighbourhood

Get Started

What kinds of plants grow where you live? The best way to find out is to look around you. By looking closely at the world around them, most First Nations and Métis people knew when and where to find plants for food, medicine, and building materials. Scientists observe the world closely, too.

> Plants grow in neighbourhoods all over Saskatchewan. Different places have different types and numbers of plants.

Can you think of a place around you that has a lot of plants?

Wark On 16

What kinds of plants grow around your school? How are these plants helpful? How can you tell if they are healthy? You will go on a field trip with your class to observe the plants in your neighbourhood.

What You Need

- camera (optional)
- guide for local plants

What You Will Do

- Work with your classmates to make a list of field trip rules. The rules should keep both people and plants safe. The rules should also show respect for Mother Earth.
- Go for a walk with your class. Make a list of the different plants you see, the places where you see plants growing, and the ways you see plants being used.



Trees give shade from the Sun and rain.





Flowers make a house look attractive.

Hedges block wind and snow to shelter houses and growing plants.





Grass stops soil from being blown or washed away by wind and rain.

- Record your observations in photos, videos, or sketches of the plants.
- Try to identify the plants using the plant guide.
- E Look closely at the plants.

 Record any signs of disease, such as holes in the leaves or discoloured parts.

Communicate



- What types of plants grow in each place? Why do you think that is? Explain your answer to a partner.
- 2. Describe any signs of disease you saw. How can you tell if plants are healthy?
- **3.** Imagine a world without plants. How might a lack of plants affect you, other animals, and the environment? Discuss your answer.

Build On What You Know

Did you see any plants that you would like to have in the garden you will design? Make a list of them.



Saskatchewan's provincial flower is the western red lily. It is illegal to pick this flower.



What Crops Grow in Saskatchewan?

Goal To investigate foods made with wheat

Get Started



in use in Canada.

Saskatchewan is rich in farmland. Crops of wheat, rice, rye grass, canola, cabbages, carrots, potatoes, peas, beans, saskatoon berries, and apples all grow in Saskatchewan. These plants grow well in the cool and dry conditions of the area. Oranges and bananas are not harvested in Saskatchewan. The trees they grow on need more warmth to produce fruit.

Saskatchewan's plant crops are made into a variety of food products. Wheat is made into flour for bread and pasta. Rye grass is used as animal feed. Canola seeds are made into vegetable oil. Fruits are made into jams, jellies, pie fillings, and syrups.



Wheat grown in dry areas, such as Saskatchewan, has hard seeds suited to making bread and pasta. Wheat grown in moister areas has softer seeds suited to making cakes, crackers, and cookies.



Scientists have bred some canola plants like these to resist disease and droughts, or dry spells.



Saskatoon berries get their name from the Cree word for "from the trees" [miskwatmin]. Saskatoons are hardy plants that can survive prairie winter temperatures well below freezing.



Wild rice is a major crop of the Lac La Ronge First Nation in Saskatchewan. The rice is shipped all over the world for people to eat.

Work Of th



Saskatchewan grows more than half of Canada's wheat. In this investigation, you will find out what foods are made with wheat.

What You Need

 variety of empty food packages and labels

What You Will Do

- Look at the list of ingredients on each package and label.
 Which foods have wheat?
 Make a list of these foods.
- Compare your list with those of classmates. Add any other foods to your list.
- With your group, choose an area in another part of the world. Research what trees, shrubs, grasses, and crops grow there.



Communicate



- 1. Did any of the foods that contain wheat surprise you? Explain your answer to a partner.
- 2. What do you think Saskatchewan would be like if we did not produce important plant products, such as wheat?
- **3.** Explain why oranges and bananas are not harvested in Saskatchewan.
- **4.** Share your research findings with the class. Describe how the plants found in the area are similar and different to those found locally.

Plants Are Food for the World

Goal To find out about plants people eat in different parts of the world

Get Started

Many First Nations and Métis peoples say that Spirit flows through plants. Scientists say that plants are one of the few living things that can make their own food. They both understand that plants are an important source of food for other living things.

Foods made from rice and wheat are the base of many people's diets around the world. People also eat a lot of plant parts, such as fruit, nuts, beans, peas, and lentils. (Nuts are fruit with a hard shell. Beans, peas, and lentils are all seeds.) Look at the photos below. What foods made from plants can you find in them?





- Here is the food that the Ukita family of Kodaira City, Japan, eats in a week.
- Here is the food that the Ayme family of Tingo, Ecuador, eats in a week.



A Here is the food that the Aboubakar family of Breidjing Camp in Chadeats in a week.



What plants do people who live in different places eat? Here is your chance to find out.

What You Will Do

Look at the map and photos of families on these pages. In a table like the one below, record where each family lives.

Place Where Family Lives	Plant Parts, And Foods That Come From Planis

Look closely at the food in each photo. Try to identify any plants, parts of plants, and foods made from plants. List them in the table.



The pushpins on this world map show where the families shown in the photos live.

- Which family eats the most food from plants? Which eats the least?
- Choose one place from your table. Research what types of trees, grasses, and other plants grow there and how the plants are used.

Communicate



- Write down all the foods you ate yesterday. Circle the foods that come from plants.
- 2. Do any of the foods on your list come from wheat or a product of wheat, such as flour? Compare your list with those of classmates.
- **3.** Why do you think families who live in different places have different diets?
- **4.** With the class, share what plants grow in the area you researched and how people use the plants.



Apples, bananas, and cinnamon all grow on trees. Cinnamon is made from the dried bark of the cinnamon tree.

Nature's Renewal

Goal To research how forest fires affect plants





When a forest fire starts naturally, some First Nations people say that Spirit in fire visits the forest to renew what needs to be renewed.

"Wow! Look at all the new trees there!" said Ashtyn as a charred, burnt field came into view. Ashtyn was hiking with his grandfather and his little sister Kiah to go fishing at the river near his grandfather's house.

"What happened there, Grandpa?" asked Ashtyn.
"Why are so many new trees growing there?"

"Last fall, we had a huge bushfire," said Grandpa.
"Lightning struck during a thunderstorm and started a fire there. Many fallen, old trees caught fire and burned very quickly. Since then, the community has worked together to plant new seedlings. Nature has done its part, too. New trees have sprouted where the old ones were burned down by the fire."



Plants can grow back after a forest or prairie fire. Find out how fires affect plants.

What You Will Do

- With your group, choose one topic to research:
 - How do forest or prairie fires help plants?
 - How do forest or prairie fires harm plants?
- Work together to research your topic.
 - Remember that forest and prairie fires can start from natural or human causes. Find out about both types.
- Make a list of reasons why, how, and when a fire is helpful (or harmful) to a forest.
- Get ready to present your group's findings. Create a list of points for a class debate or a group skit, video, or research log.

Communicate



- Do you think fires are more helpful or harmful to plants? Use your points for a class debate or present your skit, video, or research log to help the class decide.
- 2. How do plants grow back naturally after a fire?
- 3. How do people help plants grow back after a fire?
- 4. What if trees did not grow back after a fire? Discuss how this might affect the environment, people, and you.

lesson

How Can People Affect Plants?

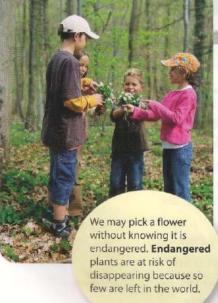
Goal To investigate how road salt can affect plants

Get Started ▶

Some of our actions can affect the plants around us. Whether we realize what we are doing or not, our actions can affect the survival of plants. Look at the photos below. How do you think each of these actions affects plants?

We salt snowy roads to help stop them from getting slippery. When the snow melts into water and flows, it carries the salt into nearby areas where plants may live.









In this investigation, you will find out how road salt can affect nearby plants.

SAFETY CAUTION!

handle the road salt.



What You Will Do

- Label one plant "clean water" and the other "water with road salt."
- Label one jug of water "clean water."
- Add 500 mL of road salt to the other jug of water. Label the jug "water with road salt."
- Shake the jug for about 1 minute until the salt dissolves in the water. (The salt has dissolved when you can no longer see it.)

What You Need

- 2 identical plants
- 4 labels and marker
- 2 jugs of water
- measuring cup
- rubber gloves
- spoon
- road salt
- camera (optional)



- Place both plants in a sunny place. Water each with the matching jug for one to two weeks. Make sure the soil is moist but not soggy.
- Watch what happens to the plants. Draw or take pictures of what you see.

Communicate



- 1. What changes did you see in each plant?
- 2. How could you tell if the plants were healthy?
- 3. What impact is salting our highways having on some plants? Explain your answer to a partner.

How Can People Help Plants?

Goal To explore how people can help plants grow

Get Started

You know that plants need sunlight, water, nutrients, and space to grow. Plants have roots to get water and nutrients from the soil. They have leaves to get sunlight. But, in some places, it is hard for plants to get what they need to survive.



How do these points make it hard for a plant to grow? How can people help?

- The soil does not have enough nutrients in it.
- There is not enough water.
- There is garbage and pollution.
- The ground is covered with pavement.





These pictures show how people can help plants grow.



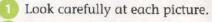
Stop Dutch Elm Disease

PLEASE

Do not pick flowers.

Do not trample on plants.

Do not littor



Make a list of ways people can help plants.

- With your group, choose one of these actions:
 - · harvesting crops
 - fertilizing crops
 - · protecting some areas where plants grow
- 4 List all the positive and negative ways the action uses plants and/or protects plants. Decide if the positive ways are greater than the negative ways. Be prepared to defend this position.

Communicate



1. Present your group's position to the class. Discuss and defend it.